

WE CLAIM:

1. A method for producing regenerable sulfur sorbents comprising the steps of:

mixing a support material precursor, isopropanol and a first portion of deionized water at an elevated temperature, forming a sol mixture;

dissolving a metal oxide precursor comprising a metal suitable for use as a sulfur sorbent in a second portion of deionized water, forming a metal salt solution;

mixing said sol mixture and said metal salt solution with a sol peptizing agent while heating and stirring, forming a peptized sol mixture;

dispersing said metal oxide precursor substantially throughout said peptized sol mixture;

drying said peptized sol mixture, forming a dry peptized sol mixture, and calcining said dry peptized sol mixture, forming a calcined material; and

converting said calcined material to particles.

2. A method in accordance with Claim 1, wherein said metal oxide is selected from the group consisting of zinc oxide and copper oxide.

3. A method in accordance with Claim 2, wherein said metal oxide is zinc oxide.

4. A method in accordance with Claim 1, wherein said support material is an oxide of an element selected from the group consisting of aluminum, zirconium, silicon and mixtures thereof.

5. A method in accordance with Claim 1, wherein said dry peptized sol mixture is calcined at a temperature in a range of about 400°C to about 500°C.

6. A method in accordance with Claim 1, wherein said particles have a diameter in a range of about 45 microns to about 300 microns.

7. A method in accordance with Claim 1, wherein said particles comprise a range of about 10% to about 60% by weight of said metal oxide.

8. A regenerable sorbent composition comprising:
a metal oxide disposed on a substrate material and comprising in a range of about 10% to about 60% by weight of said regenerable sorbent composition, said metal oxide suitable for sorbing sulfur.

9. A regenerable sorbent composition in accordance with Claim 8, wherein said metal oxide is selected from the group consisting of zinc oxide, copper oxide, manganese oxide, iron oxide and mixtures thereof.

10. A regenerable sorbent composition in accordance with Claim 9, wherein said metal oxide is zinc oxide.

11. A regenerable sorbent composition in accordance with Claim 8, wherein said substrate material is selected from the group consisting of zirconia, silica, alumina, titania and mixtures thereof.

12. A regenerable sorbent composition in accordance with Claim 8, wherein said composition forms a plurality of pores whereby said composition has a mercury pore surface area greater than about 10 m²/g.

13. A regenerable sorbent composition in accordance with Claim 12, wherein said plurality of pores has a mean pore diameter of less than about 500 Å.

14. A regenerable sorbent composition in accordance with Claim 13, wherein said mean pore diameter is less than about 200 Å.

15. A regenerable sorbent composition produced in accordance with the method of Claim 1.